

MONTANA DEPARTMENT OF FISH AND GAME
FEDERAL AID IN FISH RESTORATION SECTION
HELENA, MONTANA

JOB COMPLETION REPORT
INVESTIGATIONS PROJECTS

State of Montana

Name Rock Creek Creel Census

Project No. F-27-R-1

Title Summer and Winter Census

Job Nos. I and II

Period Covered: May 1, 1959 through April 30, 1960

Abstract:

During the summer of 1958 and winter of 1958-59, a pilot creel census study was conducted on a 40-mile section of Rock Creek (east of Missoula). This pilot study was to determine the efficacy of certain census techniques. At the end of the pilot study recommendations were made to continue the study on a long-term basis with some suggested minor changes. This report deals with the methods and findings of the creel census conducted during the summer of 1959 and the winter of 1959-60. Estimates of pressure and harvest are presented. It was estimated that a total of 16,211 anglers fished Rock Creek for 52,780 hours and harvested 55,186 game fish during 1959-60 general fishing season and winter white-fishing-only season.

Objectives:

The overall objectives of the Rock Creek creel census study, as stated in the original specifications for this study "would be to obtain the necessary harvest and pressure information for an evaluation of the catchable-sized, trout-stocking program; certainly for Rock Creek itself, and likely with considerable application to other western Montana waters as well." Specific objectives of the first year's study were to determine whether or not it was feasible "to obtain good estimates of (1) total pressure, total catch by species, and total number of hatchery trout taken during the general summer season, and (2) total pressure, total whitefish catch and total number of trout hooked and released during the winter 'white-fish only' season."

Under the recommendations of the completion report of the pilot study, it was stated that the methods used there were applicable to an intensive creel census study on Rock Creek, that the study be set up for an initial three-year period and that a project biologist be assigned to be in direct charge of the study.

These recommendations were followed out and the creel census was conducted during the 1959-60 fishing season. Most of the procedures used during the first year of the study were continued during the second year. Several minor procedure changes were made. They will be discussed in the following section.

Techniques Used:

After the pilot study (1958-59) was conducted and it was decided that the creel census study should be continued, temporary census buildings were built at district 2 headquarters and erected at the census stations on Rock Creek Road. These 12 feet by 10 feet, plywood and two-by-four-constructed buildings were put up both for efficiency of creel census operations and for protection of equipment from the weather.

An hourly-recording, battery-operated traffic counter (Amet-Streeter Mfg. Co.) was installed at the lower checking station to obtain counts of the total numbers of vehicles using Rock Creek Road. Census technicians recorded the numbers of non-fishermen cars leaving the area in order to obtain ratios of fishermen to non-fishermen cars during check hours. These ratios will be used in the future to estimate fishermen pressure and harvest on periods when there is no creel census coverage.

The portable signs, that were used the first year to inform anglers that the creel checking stations were in operation, were replaced by permanent, folding signs containing the same information. At the locations of the folding signs, 1000 yards from the stations and inside the study area, kerosene road flares were lighted during operating hours to attract attention to the signs. In addition to the above devices, portable signs were put up on the roadside at the checking stations with wording "Stop. Checking Station. Montana Fish and Game Dept."

No newspaper advertising was used this year, but fisheries personnel attended local sportsmen club meetings, where they reminded club members of the study, asked their cooperation in informing local fishermen of the study, and distributed the results of last year's pilot study.

Stocking of Hatchery-reared Fish:

Prior to the stocking of hatchery-reared fish the project biologist traveled the study area by automobile, noting the areas of heaviest fishing pressure. A total of 26,765 fin-clipped (adipose fin and left pelvic fin) catchable-sized rainbow were planted. Section 1 of the study area received 14,330 of these fish and Section 2 received 12,435. The project biologist accompanied the liberation truck on all plants so that he could designate the specific liberation sites. These sites were chosen according to the following criteria. (1) That they were in areas of relative heavy fishing pressure, (2) They were accessible from the road and (3) There was fairly swift water in which to liberate the fish.

Creel Census Operation:

a. General Fishing Season. During the general fishing season -- May 24 through November 30, 1959 -- both checking stations were operated simultaneously for 55 weekend days and 83 week-days, according to a prearranged schedule. Appendix I is the prearranged census schedule for the general fishing season. The criteria for drawing up the schedule are listed below.

- (1) All weekend days were censused.
- (2) Week-days were censused on a three day-per-week rotation basis. That is, three week-days were censused per week, with no day of the week without a census check for two consecutive weeks.

- (3) Census days were scheduled for checks as a.m. or p.m. days. A.m. days were checked from 9:00 a.m. to 5:00 p.m. and p.m. days were checked from 2:00 p.m. to 10:00 p.m.
 - (a) Weekend days were scheduled separately from week-days, with alternating a.m. and p.m. checks throughout the general fishing season.
 - (b) Week-days were scheduled for generally-alternating a.m. or p.m. checks. Occasionally there were two consecutive a.m. or two consecutive p.m. check days.
- (4) Opening day of fishing season was worked as a complete check day.
- (5) Census stations were operated according to the schedule outlined above except that the lower station was operated for 14 consecutive days, June 22 through July 5, as a complete check of fishermen from 6:00 a.m. to midnight each day.

b. Whitefishing-only season. The schedule for operation of creel checking stations during the whitefishing-only season is presented in Appendix II. From December 1 until mid-February the stations were operated from 11:00 a.m. until 5:00 p.m. during each census day. As the season progressed and there were more daylight hours the stations were operated from 10:00 a.m. to 6:00 p.m. These checks were considered complete censuses of those days checked.

All weekend-days were censused at both stations. The schedule for week-day checks was arranged so that one census technician could operate the upper checking on weekends and both stations during the week. Where possible, 1) two consecutive week-days were censused at each station and 2) no day of the week lacked being censused for two consecutive weeks. Both stations were censused for 34 weekend days. Twenty-six week-days were checked at the lower station and 27 at the upper station.

c. Type of Data Collected and Method of Compilation. For each census day during the general fishing season and the whitefishing-only season, a creel census form was filled out and information was recorded for each fisherman party leaving the study area.

- (1) Time of contact.
- (2) Numbers of anglers in each party.
- (3) Number of hours fished.
- (4) Catch (recorded separately by species, and by marked hatchery trout).
- (5) Section in which party fished.
- (6) Bait or lure used.
- (7) When time permitted, fish were weighed by species and scale samples taken.

Estimates for total pressure and catch were obtained by the same methods used during the first year of the creel census study. Those methods are presented here as they appeared in the completion report for that year.

Total pressure and catch estimates were derived from the contact data by (1) expanding partial day (a.m. or p.m.) contact figures to full day estimates, and (2) computing total period estimates from total census-day estimates. Data were treated separately for each census period and for each census station. Weekday and weekend-day estimates were computed separately throughout these expansion procedures, until the final step of making total estimates for the period concerned.

The first expansion step above was carried out as follows:

1. All week-day (or week-end-day) "cars contacted" data were divided into a.m. and p.m. categories.
2. Cars contacted in each of the a.m. and p.m. categories of these days were summarized separately for:
 - a. Cars contacted in overlap period.
 - b. Cars contacted in non-overlap period.
 - c. Total cars contacted.
3. The quotient of "total cars contacted", divided by "cars contacted in overlap period", was computed for the a.m. and p.m. categories.
4. These quotients were then multiplied by the overlap car counts of each individual day of the opposite category. (The a.m. quotient by each day of the p.m. group and the p.m. quotient by each day of the a.m. group). The resulting products (one for each individual census day of the period concerned) were considered estimates of "cars contacted in overlap period" plus cars which would have been contacted in the "missed" portion of each census day. By adding each individual day's product to the "non-overlap" portion of the cars contacted on the same day, estimates of total cars for each individual day were obtained.

Following is an algebraic description of the above described method:

Where: A = overlap portion of cars contacted in an a.m. day
 B = ~~non-overlap~~ portion of cars contacted in an a.m. day
 A + B = total cars contacted in an a.m. day
 X = overlap portion of cars contacted in a p.m. day
 Y = non-overlap portion of cars contacted in a p.m. day
 X + Y = total cars contacted in a p.m. day

Then: $\frac{\sum (X + Y)}{\sum X} \cdot A + B$ = Estimated total cars contacted for each individual a.m. day.

$\frac{\sum (A + B)}{\sum A} \cdot X + Y$ = Estimated total cars contacted for each individual p.m. day.

5. The estimated total cars contacted for each individual day were then divided by the actual cars contacted for the same day. This quotient was then used as a multiplier to expand the rest of the individual days' contact data (fishermen, hours, fish, etc.) to total days' estimates.

These daily estimates were expanded to period estimates by the following procedures:

1. Total census day estimate data were summed, with a.m. and p.m. days combined.
2. Total week-days (or week-end-days) in the period were divided by total week-days (or week-end-days) censused in the period. This quotient, multiplied by the summed estimated data from No. 1 above gave estimated total catch and pressure data for all week days (or week-end-days) in the period.
3. Week-day and week-end-day total estimates were summed for total period estimates.

For the periods during which census coverage was considered complete for each day (May 24, June 22 through July 5, and the winter whifefish-only season) no individual daily expansions for a.m. or p.m. portions of days were applicable, and only the steps of expanding total daily estimates to period estimates were used.

The creel census forms used were changed slightly (from those used in 1958-1959) to allow space for recording catch from tributary streams. Appendix III is a sample creel census form used during the 1959-1960 season.

Scale sample information was recorded on standard Montana Fish and Game Department scale sample envelopes, and that information, with the scale samples, were sent to the fisheries laboratory in Bozeman for age and growth analysis.

The same creel census form was used to record information obtained from anglers during the whitefish-only season. During this season the same information was obtained from whitefish fishermen as during the general season. In addition, each winter fisherman was asked the number of trout that he had hooked and released. The purpose of this, as in the first year of the study, was to determine if the numbers of trout hooked and released was large enough to have appreciable effects on the trout population in Rock Creek.

When estimating total weights of fish caught from Rock Creek during the first year of the study (1958), no data were available on which to base a conversion of dressed to round fish weights of those fish weighed at the checking stations. For this reason, all fish weights (round and dressed) were lumped together into the totals for the season. One of the recommendations in the completion report for that year of the study was to make a "collection of sufficient round to dressed fish weight data from individual fish to enable the making of valid conversions of dressed fish weight records to round fish weight estimates, by species."

During the 1959 season these weight data were collected by the following methods.

1. Contacting individual anglers on the stream and weighing their fish.
(This method was not successful--very few fish weights could be obtained in this manner.)
2. Obtaining weights of fish that were checked through the checking stations.
3. Obtaining weights of fish that were collected as part of the fisheries survey on Rock Creek (Project F-12-R-6).

Individual fish were weighed, dressed out, and then weighed again, and average weight-loss due to dressing was computed for each species. This weight-loss was expressed in percentage. Weights were obtained from fish caught or collected at various times of the day and

at various times during the general fishing season. This was not done systematically, but merely in the manner which would contribute as many individual fish weights as possible. The following is a list of the average percentages of weight-loss of fish, by species.

<u>Species</u>	<u>No. of fish in sample</u>	<u>Percentage wt. loss</u>
Loch Leven	9	18.6%
Dolly Varden	21	19.4%
Eastern Brook	98	21.8%
Whitefish	124	20.6%
Cutthroat	66	20.3%
Rainbow	97	21.0%

The following method of estimating total weight of the catch, which was essentially the same as used for the 1958-59 season, was also followed for the 1959-60 fishing season.

1. All dressed weights were converted to round wts. using the wt. loss factor previously mentioned.
2. A minimum of 20 fish per species for each period of the season were required for an average weight sample.
3. If 20 fish per species were not available for a period, then the total amount of fish weighed during the preceeding and following period were added to the fish weighed during the period concerned, and the average weight computed.
4. During the first period, when there was not a preceeding period, average weights were computed by addition of those fish weighed during the next period.

After computing average weights per species, per station, for each period of the summer season, these average weights were multiplied by the estimated number of fish, by species taken during each period. This result gave the total estimated weights of fish by species for each period.

Average weight computation for whitefish taken during the winter whitefish-only season were computed from all whitefish weighed during the entire winter season. Although the data for the conversion of round to dressed weights were obtained from fish collected during the summer, the conversion percentage for whitefish was used for winter whitefish weights.

As in 1958, all weights were taken with a 20-pound capacity scales, registering in pounds and ounces. Ounces were converted to tenths of pounds for the purpose of obtaining average weights.

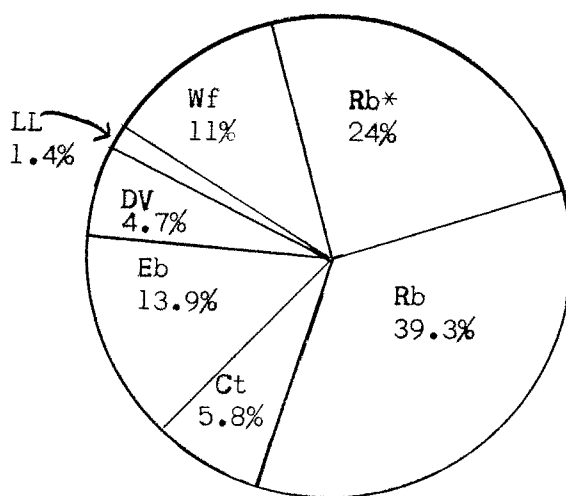
Findings:

As in the first year of the creel census study, the following species of game fish were caught during the 1959 summer season:

<u>Species of Game Fish</u>	<u>Abbreviations used in this report</u>
Rainbow trout <u>Salmo gairdneri</u>	Rb
Cutthroat trout <u>Salmo clarki</u>	Ct
Brown trout <u>Salmo trutta</u>	LL
Dolly Varden trout <u>Salvelinus malma</u>	DV
Eastern brook trout <u>Salvelinus fontinalis</u>	Eb
Whitefish <u>Prosopium williamsoni</u>	Wf

During the summer season, creel census technicians contacted 8361 anglers and recorded 26,944 fish at station 1. They contacted 1,493 fishermen and recorded 5,407 fish at station :

FIGURE I



PERCENTAGE OF TOTAL CATCH BY SPECIES
FROM BOTH SECTIONS OF ROCK CREEK
1959 GENERAL FISHING SEASON

Figure 1 illustrates percentages of total catch by species during the 1959 season.

Appendix IV shows the estimated fishermen pressure and estimated catch by stream section for the 1959 general fishing season. Figure 2 compares the estimated average catch and pressure by period of the summer seasons for 1958 and 1959. Figure 3 compares the estimated average catch by anglers and the catch per angler hour for both sections of Rock Creek during the 1958 and 1959 general fishing seasons. Figure 4 compares the catch by species for both 1958 and 1959 summer seasons.

Anglers caught fewer fish in Rock Creek during the 1959-60 general fishing season than during the 1958-59 general season. Except for hatchery rainbow, the drop in total catch from the stream was accounted for by the decreased numbers of fish checked out through the upper creel checking station. In the lower section, there was a decrease in catch of hatchery fish and increases of all other species. In the lower section, during the 1959-60 season, there was an increase in the number of anglers and a decrease in the number of fishermen hours spent on the stream. There was an overall decrease in fishing pressure (both in numbers of fishermen and hours spent) and catch in the upper section during the 1959-60 season. At both stations there was a decrease in catch per angler and an increase in catch per angler-hour spent on the stream. Below are comparisons of fishermen success on Rock Creek between the 1958 and 1959 general fishing seasons. The decrease in numbers of fish per angler can quite possibly be attributed to the decrease in the numbers of hours per angler trip to the stream.

		<u>Fish Per Angler</u>	<u>Fish Per Angler-Hour</u>
Both Stations:	1958	3.39	.91
	1959	3.07	.94
Station 1:	1958	3.12	.85
	1959	2.93	.90
Station 2:	1958	4.33	1.08
	1959	3.71	1.10

In 1958 there were 38,195 catchable-sized hatchery-reared rainbow trout released in Rock Creek. An estimated 13,305 of these were caught during that season for a return to the fishermen's creels of 34.8%.

During the 1959-60 season there were an estimated 436 more 1958 hatchery fish caught. This raised the return of the 1958 plant to 36.0%. During the 1959-60 season we estimated that 10,534 or 39.3% of the 26,765 hatchery fish planted were caught by anglers. Table 1 shows the return of hatchery rainbow during the years they were planted and the occurrence of those hatchery fish in the total catch.

Table 1. The return of hatchery rainbow during the years they were planted and the occurrence of those hatchery fish in the total catch.

		PLANT OF HATCHERY RB	RETURN OF HATCHERY RB	% RETURN	TOTAL FISH CAUGHT	% HATCHERY RAINBOW
1958	Lower Station	21,795	9,641	44.2	35,844	26.9
1958	Upper Station	16,400	3,664	22.3	14,476	25.3
1958	Both Stations	38,195	13,305	34.8	50,320	26.4
1959	Lower Station	14,330	7,584	52.9	35,969	21.1
1959	Upper Station	12,435	2,950	23.7	9,840	30.0
1959	Both Stations	26,765	10,534	39.3	45,809	23.0

Catch from tributary streams.

In considering the catch estimates from Rock Creek, it should be understood that fish caught from tributary streams in the study area are included in those estimates. During the 1959 season numbers of fish, by species, were recorded according to tributary streams from which they were caught.

Of the 32,351 fish that were seen at the checking stations, 1339 (4.1%) were caught from tributary streams. Ranch Creek, which flows into Rock Creek approximately 13 miles from its mouth, contributed over half of the total fish caught from all side streams.

The Forest Service maintains a large public campground on Ranch Creek--about one mile from where it enters Rock Creek. This is a popular camp for weekend campers and many of these people fish the creek between fishing trips to Rock Creek. In past years a few hundred of the hatchery rainbow trout for Rock Creek have been planted in Ranch Creek. In 1959 approximately 200 hatchery marked rainbow were planted in Ranch Creek in the area of heaviest fishing.

In 1959 creel census technicians checked seventeen 1959 and five 1958 hatchery rainbow that were caught out of Ranch Creek.

One 1959 hatchery rainbow was caught from Big Hogback Creek and 19 from Stoney Creek. Ranch Creek was the only side stream that received a plant of hatchery fish. Table 2 lists Rock Creek tributary streams (in the study area) from which fish were caught and the numbers of fish caught from them. These are fish that were checked by creel census personnel. There was no attempt to make separate estimates of catch from the side streams. Rather, they are included in the estimates for the entire drainage in the study area. Note that most of the total catch from tributary streams was made up of cutthroat trout (34%) and eastern brook trout (45%).

Table 2. Fish checked from Rock Creek tributary streams, Rock Creek Creel Census Study Area, 1959 season, both sections.

Tributary	1959 Plant	1958 Plant	Rb	Ct	Eb	DV	LL	Wf	Totals
Kitchen Gul.	0	0	0	0	22	0	0	0	22
Ranch Cr.	17	5	52	276	323	103	1	3	780
Spring Cr.	0	0	2	0	124	0	0	0	126
Welcome Cr.	0	0	0	31	0	2	0	0	33
Gilbert Cr.	0	0	9	0	29	1	3	0	42
Cougar Cr.	0	0	0	0	0	6	0	0	6
Big Hogback Cr.	1	0	2	0	66	0	1	0	70
Stoney Cr.	19	0	15	96	28	4	0	15	177
Brewster Cr.	0	0	0	53	0	0	0	0	53
Wyman Cr.	0	0	9	1	8	4	0	0	22
Unknown	0	0	0	0	8	0	0	0	8
Totals	37	5	89	457	608	120	5	18	1339

Age and Growth Analyses:

As previously stated, when time permitted at the checking stations, individual fish were weighed and measured and scale samples were taken. The scales and data were analyzed at the department's fishery laboratory at Bozeman. Age and growth analyses are presented in Appendix V and compared with the analyses of scale samples collected during the 1958 summer creel census. The direct proportion method of back calculation of total lengths at each annulus was used.

As in 1958, the analyses of 1959 samples show a faster growth rate in brown trout than other species and a faster growth rate in rainbow trout taken from the lower section of the study area. Whitefish taken from the lower section during 1959 summer season showed a considerably faster rate of growth than those taken from the upper section of Rock Creek. No whitefish scale samples were taken during the 1958 summer season.

During the 1959-60 whitefish-only season there were an estimated 1,291 anglers who fished 3,886 hours and caught 9,377 whitefish from the study sections of Rock Creek. This was an increase of 112 anglers and 4,212 fish over the estimates for the 1958-59 whitefish-only season. Appendix VI shows the total estimated pressure, catch of whitefish, and the numbers of trout hooked and released during the 1959-60 season.

Below are comparisons of angler success and average numbers of trout hooked and released for the two years.

		<u>Whitefish Per Angler</u>	<u>Whitefish Per Angler Hour</u>	<u>Trout Hooked & Released Per Angler</u>
Both Stations:	1958	4.4	1.5	.5
	1959	7.2	2.4	.7
Station One:	1958	4.3	1.5	.7
	1959	7.0	2.4	.8
Station Two:	1958	5.1	1.9	.04
	1959	5.4	2.3	.1

The increase in average catch per angler & per angler hour on the stream occurred with only a slightly higher average number of hours per angler trip -- 3.0 during the 1959-60 season versus 2.9 hours during the 1958-59 season.

Recommendations:

It is recommended that the Rock Creek creel census study be continued on the same general basis as the first two years, until the objectives have been achieved. The scheduling of the creel census checks should be examined to determine the best method to achieve economy and statistically valid estimates.

It is also recommended that an hourly-recording traffic counter be installed at the upper creel checking station and used to obtain fisherman-to-non-fisherman car ratios for the upper section of the study area.

APPENDIX I

ROCK CREEK CREEL CENSUS SCHEDULE

May 24 through October 2, 1959

9:00 a.m. - 5:00 p.m. - a.m. days worked
2:00 p.m. - 10:00 p.m. - p.m. days worked

* - all day
() - a.m. days
— - p.m. days

Month	Sat.	Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.	Summary
May	(30)	24* <u>31</u>	25	(26)	<u>27</u>	(28)	29	
June	(6) <u>13</u> <u>20</u>	<u>7</u> (14) (21)	<u>1</u> (8) 15 (22)	2 <u>9</u> 16 <u>23</u>	3 (10) <u>17</u> 24	(4) 11 <u>18</u> 25	<u>5</u> 12 (19) (26)	PERIOD I
July	(27) <u>4</u> (11) <u>18</u> (25)	<u>28</u> (5) <u>12</u> (19) <u>26</u>	29 (6) <u>13</u> 20 <u>27</u>	<u>30</u> 7 (14) 21 (28)	(1) 8 <u>15</u> (22) 29	<u>2</u> <u>9</u> 16 <u>23</u> 30	3 (10) 17 (24) <u>31</u>	PERIOD II
August	<u>1</u> (8) <u>15</u> (22) <u>29</u>	(2) <u>9</u> (16) <u>23</u> (30)	3 <u>10</u> (17) 24 (31)	(4) 11 <u>18</u> 25	<u>5</u> 12 (19) <u>26</u>	(6) (13) 20 <u>27</u>	7 <u>14</u> 21 <u>28</u>	PERIOD III
September	(5) <u>12</u> (19) (26)	6 (13) <u>20</u> <u>27</u>	(7) (14) <u>21</u> 28	<u>1</u> <u>8</u> 15 (22) 29	2 (9) 16 <u>23</u> (30)	3 <u>10</u> <u>17</u> 24	(4) 11 (18) 25	PERIOD IV
October	(3) <u>10</u> (17) <u>24</u> (31)	<u>4</u> (11) <u>18</u> (25)	(5) 12 <u>19</u> (26)	<u>6</u> (13) 20 (27)	7 (14) 21 <u>28</u>	(1) 8 <u>15</u> (22) 29	<u>2</u> <u>9</u> 16 <u>23</u> 30	PERIOD V
November	<u>7</u> (14) <u>21</u> (28)	<u>1</u> (8) <u>15</u> (22) <u>29</u>	2 (9) <u>16</u> 23 30	3 <u>10</u> 17 <u>24</u>	<u>4</u> (11) 18 (25)	<u>5</u> 12 <u>19</u> 26	(6) <u>13</u> 20 (27)	PERIOD VI

APPENDIX II

ROCK CREEK CREEL CENSUS SCHEDULE WHITEFISH-ONLY SEASON

*All Weekend days will be checked at both stations.

Checks during whitefish season will be from 9:00 a.m. - 5:00 p.m.

() - Check at upper station only.

— - Check at lower station only.

Month	Sat.	Sun.	Mon.	Tues.	Wed.	Thurs.	Fri.
December				1	(2)	(3)	<u>4</u>
	*5	*6	(7)	<u>8</u>	<u>9</u>	10	<u>11</u>
	12	13	14	15	<u>16</u>	<u>17</u>	(18)
	19	20	<u>21</u>	(22)	(23)	24	25
	26	27	(28)	29	30	<u>31</u>	
January							<u>1</u>
	2	3	(4)	(5)	<u>6</u>	7	<u>8</u>
	9	10	11	12	(13)	<u>14</u>	<u>15</u>
	16	17	(18)	<u>19</u>	20	21	(22)
	23	24	<u>25</u>	26	(27)	(28)	29
	30	31					
February			<u>1</u>	<u>2</u>	3	4	(5)
	6	7	<u>8</u>	<u>9</u>	(10)	(11)	<u>12</u>
	13	14	(15)	(16)	<u>17</u>	18	19
	20	21	<u>22</u>	23	24	<u>25</u>	<u>26</u>
	27	28	(29)				
March				(1)	<u>2</u>	3	4
	5	6	7	8	<u>9</u>	(10)	(11)
	12	13	<u>14</u>	<u>15</u>	16	17	(18)
	19	20	21	(22)	(23)	<u>24</u>	25
	26	27	<u>28</u>	29	30	(31)	

Appendix IV* Estimated Pressure and Catch for 1959 Summer Season, Rock Creek, Station 1.

Period	Cars Contacted	Number Anglers	Angler Hrs.	Rainbow		1958 Htchy. Rb.		1959 Htchy. Rb.		Cutthroat	
				No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.
24 May 26 June	2,122	3,946	12,933	4,834	2,562	218	87	5	1	691	145
27 June 31 July	2,082	3,953	13,053	5,842	2,746	106	42	2,231	602	583	262
1 Aug. 7 Sept.	1,707	3,198	10,476	3,578	1,360	31	12	4,323	1,038	622	180
8 Sept. 4 Oct.	438	732	2,262	794	500	0	0	699	161	75	23
5 Oct. 1 Nov.	222	325	926	347	184	2	1	298	65	93	31
2 Nov. 30 Nov.	63	114	311	139	60	0	0	28	6	13	4
Totals	6,634	12,268	39,961	15,534	7,412	357	142	7,584	1,873	2,077	645

*Continued on following page.

Appendix IV (Cont'd) Estimated Pressure and Catch for 1959 Summer Season, Rock Creek, Station 1.

	Eastern Brook		Dolly Varden		Brown Trout		Whitefish		Total Fish	
	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.
1,990	318	607	322	206	157	604	483	9,155	4,075	
1,745	314	743	253	167	164	559	430	11,976	4,813	
1,066	298	460	202	150	179	462	388	10,692	3,657	
180	40	63	33	50	63	247	143	2,108	963	
67	15	31	16	38	44	377	158	1,253	514	
8	2	1	5	14	7	582	221	785	305	
5,056	987	1,905	831	625	614	2,831	1,623	35,969	14,327	

Appendix IV*(Cont'd) Estimated Pressure and Catch for 1959 Summer Season, Rock Creek, Station 2.

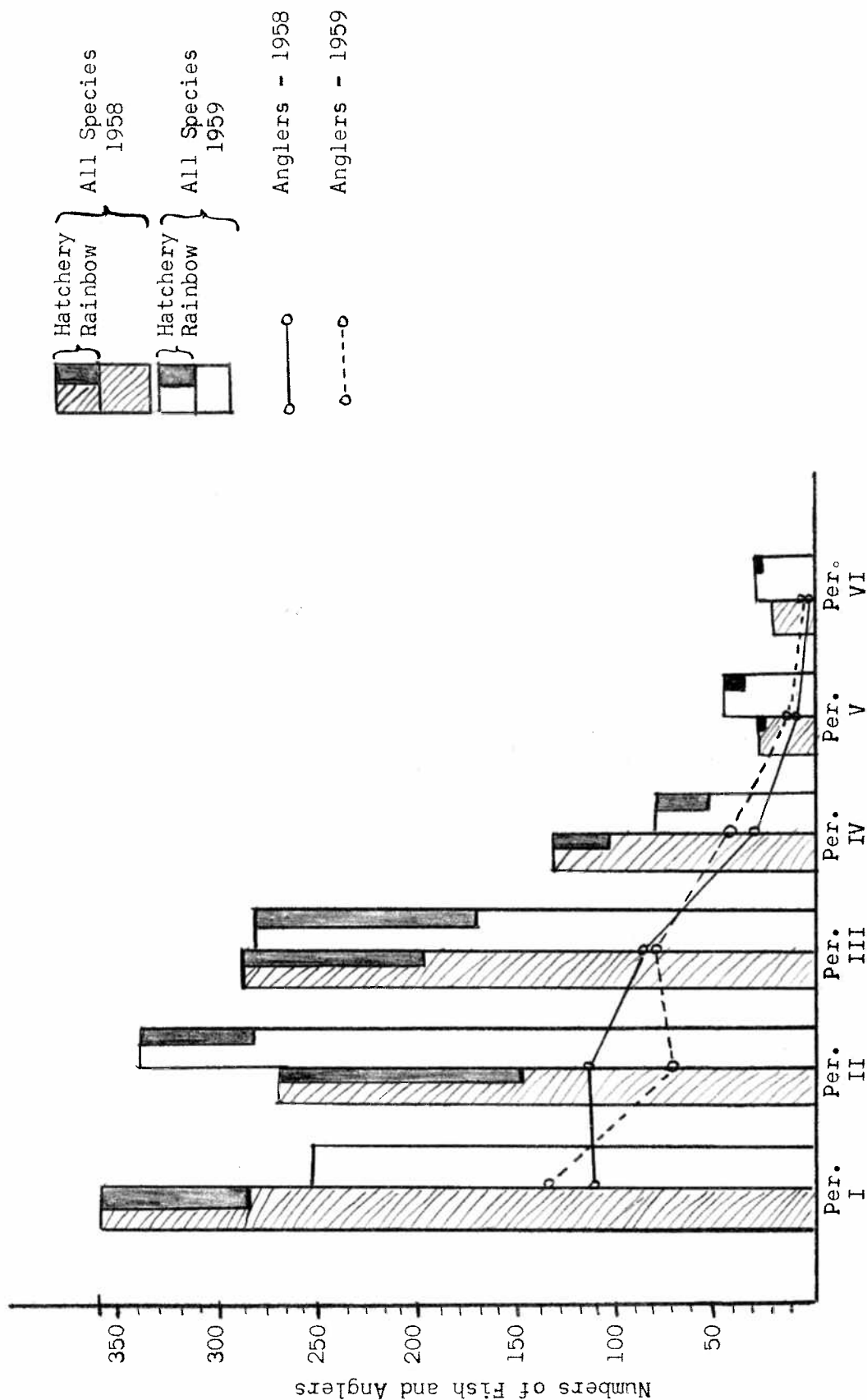
Period	Cars Contacted	Number Anglers	Angler Hrs.	Rainbow		1958		1959		Cutthroat	
				No.	Wt.	No.	Htchy. Rb. Wt.	No.	Htchy. Rb. Wt.	No.	Wt.
24 May											
26 June	482	552	1,756	467	196	44	18	0	0	71	22
27 June											
31 July	463	908	2,932	985	286	27	11	897	117	226	36
1 Aug.											
7 Sept.	403	862	3,227	826	231	4	1	1513	303	210	42
8 Sept.											
4 Oct.	80	179	632	156	53	3	1	469	113	60	22
5 Oct.											
1 Nov.	42	71	193	8	3	1	.5	36	12	1	.5
2 Nov.											
30 Nov.	35	80	193	7	3	0	0	35	11	3	1
Totals	1,305	2,652	8,933	2,449	772	79	31.5	2,950	556	571	123.5

*Continued on following page.

Appendix IV (Cont'd) Estimated Pressure and Catch for 1959 Summer Season, Rock Creek, Station 2.

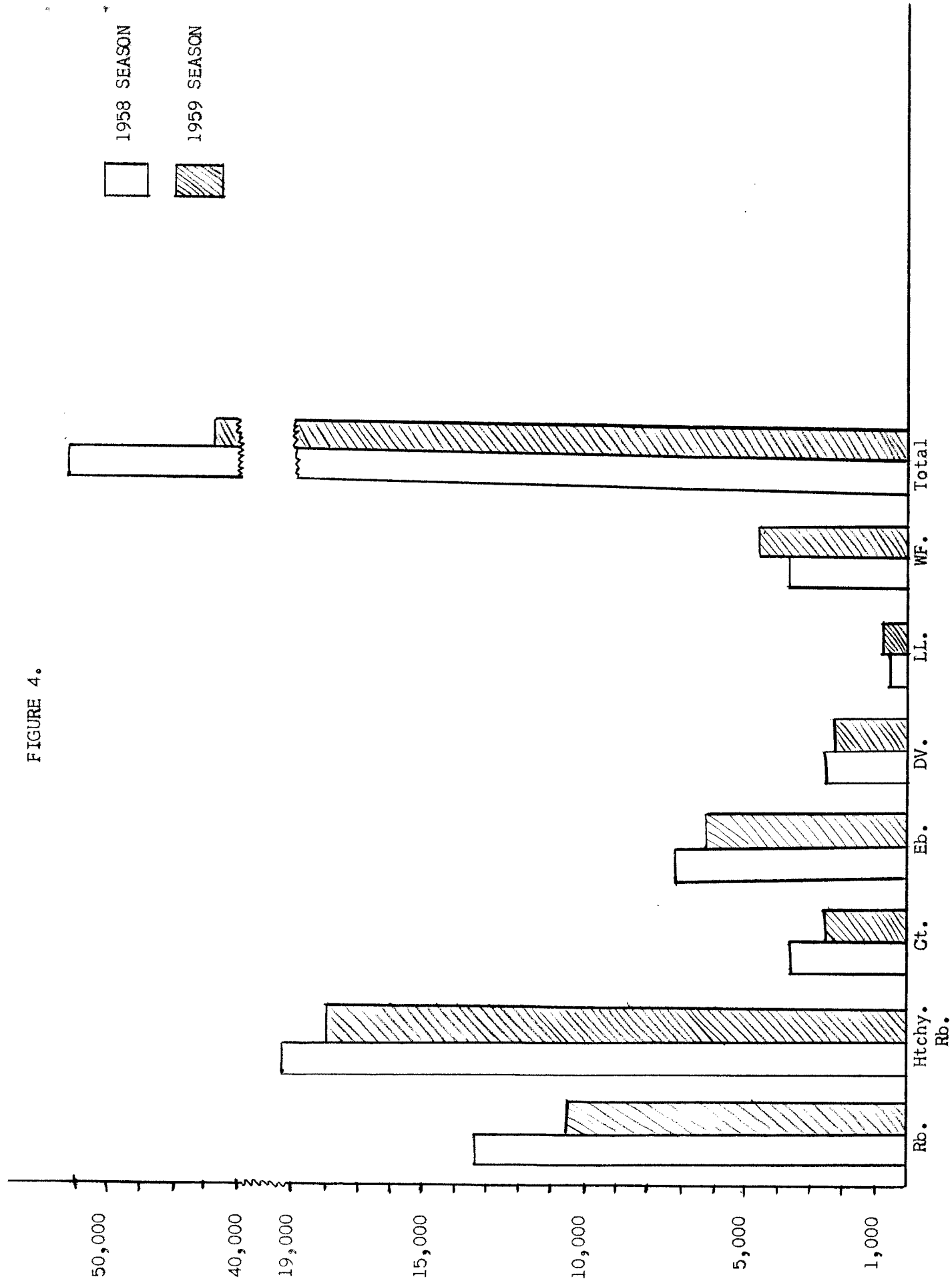
	Eastern Brook		Dolly Varden		Brown Trout		Whitefish		Total Fish	
	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.	No.	Wt.
450	59		52		26		13		9	
									477	157
									1,574	487
408	61		119		42		0		0	
									437	109
									3,099	662
389	74		78		24		0		0	
									382	111
									3,402	786
31	8		10		5		0		0	
									244	100
									973	302
0	0		4		2		0		0	
									181	56
									231	74
12	3		0		0		0		0	
									504	171
									561	189
1,290	205		263		99		13		9	
									2,225	704
									9,840	2,500

FIGURE 2



ESTIMATED AVERAGE NUMBERS OF FISHERMEN AND AVERAGE TOTAL CATCH PER DAY BY PERIOD;
1958 AND 1959 GENERAL FISHING SEASONS - ROCK CREEK CREEEL CENSUS STUDY

FIGURE 4.



COMPARISON OF CATCH BY SPECIES - ROCK CREEK, BOTH SECTIONS, 1958 AND 1959
 GENERAL FISHING SEASONS

Appendix V. Age and Growth Analyses, Both Stations, Rock Creek, 1958 and 1959 Summer Seasons.

ANNULUS							
Species	I	II	III	IV	V	VI	VII
<u>Station One</u>							
Rainbow trout.							
1958	2.8 (147)*	6.9 (140)	11.0 (78)	13.7 (36)	16.1 (6)	17.0 (2)	
1959	3.0 (166)	6.9 (138)	11.0 (74)	14.1 (42)	16.7 (4)		
Cutthroat trout.							
1958	2.7 (78)	6.3 (72)	9.7 (23)	12.4 (4)	15.4 (2)		
1959	2.7 (72)	5.7 (70)	8.9 (30)	12.6 (2)	15.7 (1)		
Dolly Varden trout							
1958	3.5 (35)	6.7 (35)	9.6 (32)	12.9 (5)			
1959	4.1 (23)	7.3 (23)	10.7 (17)	14.7 (3)			
Brown trout							
1958	3.5 (31)	8.5 (21)	12.9 (9)				
1959	4.3 (115)	9.9 (93)	13.0 (43)	15.6 (16)	17.1 (4)	17.9 (1)	
E. brook trout							
1959	4.0 (62)	6.8 (26)	10.2 (5)				
Whitefish							
1959	3.7 (101)	7.3 (76)	9.9 (34)	12.3 (14)	14.2 (6)	17.1 (1)	19.0 (1)
<u>Station Two</u>							
Rainbow trout							
1958	2.7 (118)	6.5 (113)	10.1 (66)	12.6 (19)	15.6 (3)		
1959	3.0 (47)	6.6 (41)	10.2 (21)	13.4 (8)			
Cutthroat trout							
1958	2.7 (60)	6.5 (58)	10.2 (14)	14.1 (1)			
1959	2.9 (32)	5.8 (28)	7.8 (6)	11.8 (1)			
Dolly Varden trout							
1959	3.5 (31)	6.1 (17)	9.2 (9)	13.6 (3)	16.6 (1)		
Whitefish							
1959	2.5 (13)	5.6 (13)	8.1 (13)	10.3 (5)	11.2 (1)	12.4 (1)	

*Numbers in parentheses indicate sample size.

Appendix VI.

TOTAL ESTIMATED PRESSURE AND CATCH, WITH TROUT HOOKED AND RELEASED, ROCK CREEK
WHITEFISH-ONLY SEASON, BY STATION

Period	Cars Contacted	No. Anglers	Angler Hours	Whitefish No.	Wt.	Trout Hooked and Released
<u>Station 1</u>						
Dec. 1. - Jan. 31	238	509	1,569	3,743	1,273	335
Feb. 1. - Mar. 31	<u>272</u>	<u>553</u>	<u>1,775</u>	<u>4,391</u>	<u>1,493</u>	<u>555</u>
Totals	510	1,062	3,344	8,134	2,766	890
<u>Station 2</u>						
Dec. 1. - Jan. 31	48	104	197	460	143	4
Feb. 1. - Mar. 31	<u>62</u>	<u>125</u>	<u>345</u>	<u>783</u>	<u>242</u>	<u>22</u>
Totals	110	229	542	1,243	385	26
Grand Totals	620	1,291	3,886	9,377	3,151	916

FIGURE 3.

